

CLAIMS

WHAT IS CLAIMED IS:

1. A method for producing an oral medication comprising:
dispensing a structural material, said structural material including one of a polymer or a gelatin;
curing said structural material; and
dispensing a jettable pharmaceutical solution onto said cured structural material.
2. The method of claim 1, wherein said dispensing a jettable pharmaceutical product further comprises selectively jetting said jettable pharmaceutical solution from an inkjet material dispenser.
3. The method of claim 2, wherein said inkjet material dispenser comprises one of a thermally actuated inkjet dispenser, a mechanically actuated inkjet dispenser, an electro-statically actuated inkjet dispenser, a magnetically actuated dispenser, a piezo-electrically actuated inkjet dispenser, or a continuous inkjet dispenser.
4. The method of claim 1, wherein said dispensing a structural layer comprises:
selectively jetting said structural material from an inkjet material dispenser;
said inkjet material dispenser comprising one of a thermally actuated inkjet dispenser, a mechanically actuated inkjet dispenser, an electro-statically actuated inkjet dispenser, a magnetically actuated dispenser, a piezo-electrically actuated inkjet dispenser, or a continuous inkjet dispenser.

5. The method of claim 1, wherein said step of curing said structural material comprises vacuum drying or thermally drying said structural material.

6. The method of claim 1, wherein said method further comprises dispensing alternating layers of said structural material and said pharmaceutical solution.

7. The method of claim 6, further comprising curing said alternating layers of said structural material prior to dispensing said alternating layers of said pharmaceutical solution.

8. The method of claim 1, wherein said structural material comprises one of a maltotriose-based pullulan, a gelatin, a polyvinyl alcohol (PVA), a PVA-polyethylene oxide, a PVA-vinylamine, a polyvinyl pyrrolidone (PVP), a PVP-polyvinyl acetate, a cationic PVP, a crosslinked PVP, a sorbitol, a wheat gluten, a seaweed, a cellulose, a methyl cellulose, a hydroxypropyl methyl cellulose (HPMC), a poly vinyl methyl ether (PVME), a PVME- propylene glycol monomethyl ether acetate (PMA), a poly (2-ethyl 2-oxazoline), or a pectin.

9. The method of claim 1, wherein said dispensing a structural material further comprises dispensing a plurality of selective quantities of said structural materials onto discrete locations of a substrate.

10. The method of claim 1, further comprising forming said jettable pharmaceutical solution.

11. The method of claim 10, wherein forming a jettable pharmaceutical solution comprises:
presenting an oral drug component; and

combining an edible jettable vehicle component with said oral drug component.

12. The method of claim 11, wherein said oral drug component comprises one of an ace inhibitor, an antianxiety medication, an antibiotic, a antihypertensive medication, an antiviral medication, a blood glucose regulator, an Alzheimer-type dementia medication, an anorexiant, a central nervous system stimulant, an antidiuretic, a specific antidote, an antihistamine, an antipsychotic medication, an antimanic medication, a beta blocker, a calcium channel blocker, a contraceptive, a dermatologic, a diuretic, an estrogen, a progestin, an entrapyramidal movement disorder medication, a sedative, or a hypnotic medication.

13. The method of claim 12, wherein said oral drug component further comprises one of triazolam, felodipine, trandolapril, pergolide, rivastigmine tartrate, sibutramine hydrochloride, desmopressin acetate, flumazenil, desloratadine, risperidone, carvedilol, isradipine, norgestimate, methoxsalen, metolazone, estradiol, estrogens, conjugated estrogen, esterified cabergoline, zaleplon, or zolpidem tartrate.

14. The method of claim 11, wherein said jettable vehicle component comprises a solvent.

15. The method of claim 14, wherein said solvent is configured to dissolve said oral drug component.

16. The method of claim 15, wherein said solvent is configured to partially dissolve said structural material.

17. The method of claim 16, wherein said solvent comprises one of a water and methanol acetonitrile solvent, an acetone and dimethylsulfoxide

(DMSO) solvent, a DMSO and methanol solvent, a DMSO and potassium chloride (KCl) and water solvent, a KCl and water solvent, water, a t-butanol and water solvent, an ethanol and water solvent, a methanol and water solvent, an l-propanol and water solvent, an n-propanol and water solvent, an NaCl and water solvent, a piperazine solvent, a diethylene-diamine solvent, a formamide solvent, a dimethylformamide (DMF), a DMSO solvent, a hexamethylphosphoric triamide solvent, a glycols solvent, a glycerol solvent, a dichloromethane solvent, a polar solvent, an acetone/water solvent, a dioxane solvent, an aqueous alkali solvent, a methanol/methylene chloride solvent, an N-ethylpyridinium chloride and DMF solvent, a chloroform solvent, an acetone solvent, a pyridine solvent, an ester solvent, a cyclohexanone solvent, an N-ethylpyridinium chloride and pyridine solvent, a diluted acid solvent, or an ethylene diamine solvent.

18. The method of claim 15, wherein said solvent is configured to not dissolve said structural material.

19. The method of claim 18, wherein said solvent comprises one of an organic solvent, a hydrocarbon solvent, a chlorinated hydrocarbon solvent, a lower alcohol solvent, a tetrahydrofuran solvent, a ketone solvent, a carboxylic acid solvent, an ester solvent, salt solvent, a water solvent, a diethyl ether solvent, a methylene chloride solvent, an ethanol solvent, an aliphatic hydrocarbon solvent, a diluted aqueous alkali solvent, or an alcohol solvent.

20. The method of claim 14, wherein said jettable vehicle component further comprises one of a humectant, a surfactant, a colorant, a drier, a thinner, a wax, a lubricant, a reducing oil, a solvent, a body gum, a binding varnish, an antioxidant, an anti-skinning agent, a resin, or a binder.

21. The method of claim 1, further comprising dispensing a plurality structural material layers over said jettable pharmaceutical solution to modify a release rate of said pharmaceutical solution.

22. A system for producing an oral medication comprising:
a structural material, said structural material including one of a polymer or a gelatin; and
a jettable pharmaceutical solution jetted onto said structural material.

23. The system of claim 22, wherein said structural material comprises one of a maltotriose-based pullulan, a gelatin, a polyvinyl alcohol (PVA), a PVA-polyethylene oxide, a PVA-vinylamine, a polyvinyl pyrrolidone (PVP), a PVP-polyvinyl acetate, a cationic PVP, a crosslinked PVP, a sorbitol, a wheat gluten, a seaweed, a cellulose, a methyl cellulose, a hydroxypropyl methyl cellulose (HPMC), a poly vinyl methyl ether (PVME), a PVME- propylene glycol monomethyl ether acetate (PMA), a poly (2-ethyl 2-oxazoline), or a pectin.

24. The system of claim 22, wherein said jettable pharmaceutical solution comprises:
an oral drug component; and
an edible jettable vehicle component combined with said oral drug component.

25. The system of claim 24, wherein said oral drug component comprises one of an ace inhibitor, an antianxiety medication, an antibiotic, a antihypertensive medication, an antiviral medication, a blood glucose regulator, an Alzheimer-type dementia medication, an anorexiant, a central nervous system stimulant, an antidiuretic, a specific antidote, an antihistamine, an antipsychotic medication, an antimanic medication, a beta blocker, a calcium channel blocker, a contraceptive, a dermatologic, a diuretic, an estrogen, a

progestin, an entrapylamidal movement disorder medication, a sedative, or a hypnotic medication.

26. The system of claim 25, wherein said oral drug component further comprises one of triazolam, felodipine, trandolapril, pergolide, rivastigmine tartrate, sibutramine hydrochloride, desmopressin acetate, flumazenil, desloratadine, risperidone, carvedilol, isradipine, norgestimate, methoxsalen, metolazone, estradiol, estrogens, conjugated estrogen, esterified cabergoline, zaleplon, or zolpidem tartrate.

27. The system of claim 24, wherein said jettable vehicle component comprises a solvent.

28. The system of claim 27, wherein said solvent is configured to dissolve said oral drug component.

29. The system of claim 28, wherein said solvent is configured to partially dissolve said structural material.

30. The system of claim 28, wherein said solvent comprises one of a water and methanol acetonitrile solvent, an acetone and dimethylsulfoxide (DMSO) solvent, a DMSO and methanol solvent, a DMSO and potassium chloride (KCl) and water solvent, a KCl and water solvent, water, a t-butanol and water solvent, an ethanol and water solvent, a methanol and water solvent, an l-propanol and water solvent, an n-propanol and water solvent, an NaCl and water solvent, a piperazine solvent, a diethylene-diamine solvent, a formamide solvent, a dimethylformamide (DMF), a DMSO solvent, a hexamethylphosphoric triamide solvent, a glycols solvent, a glycerol solvent, a dichloromethane solvent, a polar solvent, an acetone/water solvent, a dioxane solvent, an aqueous alkali solvent, a methanol/methylene chloride solvent, an N-ethylpyridinium chloride and DMF solvent, a chloroform solvent, an acetone

solvent, a pyridine solvent, an ester solvent, a cyclohexanone solvent, an N-ethylpyridinium chloride and pyridine solvent, a diluted acid solvent, or an ethylene diamine solvent.

31. The system of claim 28, wherein said solvent is configured to not dissolve said structural material.

32. The system of claim 31, wherein said solvent comprises one of an organic solvent, a hydrocarbon solvent, a chlorinated hydrocarbon solvent, a lower alcohol solvent, a tetrahydrofuran solvent, a ketone solvent, a carboxylic acid solvent, an ester solvent, salt solvent, a water solvent, a diethyl ether solvent, a methylene chloride solvent, an ethanol solvent, an aliphatic hydrocarbon solvent, a diluted aqueous alkali solvent, or an alcohol solvent.

33. The system of claim 27, wherein said jettable vehicle component further comprises one of a humectant, a surfactant, a colorant, a drier, a thinner, a wax, a lubricant, a reducing oil, a solvent, a body gum, a binding varnish, an antioxidant, an anti-skinning agent, a resin, or a binder.

34. The system of claim 22, further comprising a first inkjet material dispenser configured to selectively dispense said jettable pharmaceutical solution onto said structural material.

35. The system of claim 34, wherein said inkjet material dispenser comprises one of a thermally actuated inkjet dispenser, a mechanically actuated inkjet dispenser, an electro-statically actuated inkjet dispenser, a magnetically actuated dispenser, a piezo-electrically actuated inkjet dispenser, or a continuous inkjet dispenser.

36. The system of claim 34, further comprising a second inkjet material dispenser, said second inkjet material dispenser being configured to selectively dispense said structural material.

37. The system of claim 36, wherein said second inkjet material dispenser comprises one of a thermally actuated inkjet dispenser, a mechanically actuated inkjet dispenser, an electro-statically actuated inkjet dispenser, a magnetically actuated dispenser, a piezo-electrically actuated inkjet dispenser, or a continuous inkjet dispenser.

38. The system of claim 36, further comprising:
a curing device coupled to said second inkjet material dispenser;
wherein said curing device is configured to cure said structural material.

39. The system of claim 34, further comprising:
a servo mechanism coupled to said first inkjet material dispenser; and
a computing device communicatively coupled to said servo mechanism.

40. The system of claim 39, wherein said computing device comprises one of a personal computer, a laptop computer, a personal digital assistant, or a cellular telephone.

41. The system of claim 34, further comprising a substrate disposed adjacent to said first inkjet material dispenser, said substrate being configured to support said structural material.

42. A system for producing a slow release oral dosage of medication comprising:
a first layer of structural material, said structural material including one of a polymer or a gelatin;

a first inkjet material dispenser disposed adjacent to said structural material;

said inkjet material dispenser being configured to dispense a jettable pharmaceutical formulation onto said structural material; and

a second inkjet material dispenser disposed adjacent to said structural material;

said second inkjet material dispenser being configured to deposit a second layer of structural material onto said jettable pharmaceutical formulation.

43. The system of claim 42, wherein a volume of said second layer of structural material is varied to modify a release rate of said jettable pharmaceutical formulation.

44. The system of claim 42, wherein said structural material comprises one of a maltotriose-based pullulan, a gelatin, a polyvinyl alcohol (PVA), a PVA-polyethylene oxide, a PVA-vinylamine, a polyvinyl pyrrolidone (PVP), a PVP-polyvinyl acetate, a cationic PVP, a crosslinked PVP, a sorbitol, a wheat gluten, a seaweed, a cellulose, a methyl cellulose, a hydroxypropyl methyl cellulose (HPMC), a poly vinyl methyl ether (PVME), a PVME- propylene glycol monomethyl ether acetate (PMA), a poly (2-ethyl 2-oxazoline), or a pectin.

45. The system of claim 42, wherein said jettable pharmaceutical solution comprises:

an oral drug component; and

an edible jettable vehicle component combined with said oral drug component.

46. The system of claim 45, wherein said oral drug component comprises one of an ace inhibitor, an antianxiety medication, an antibiotic, a

antihypertensive medication, an antiviral medication, a blood glucose regulator, an Alzheimer-type dementia medication, an anorexiant, a central nervous system stimulant, an antidiuretic, a specific antidote, an antihistamine, an antipsychotic medication, an antimanic medication, a beta blocker, a calcium channel blocker, a contraceptive, a dermatologic, a diuretic, an estrogen, a progestin, an entrapyramidal movement disorder medication, a sedative, or a hypnotic medication.

47. The system of claim 45, wherein said jettable vehicle component comprises a solvent.

48. The system of claim 47, wherein said solvent is configured to dissolve said oral drug component.

49. The system of claim 48, wherein said solvent is configured to partially dissolve said structural material.

50. The system of claim 48, wherein said solvent comprises one of a water and methanol acetonitrile solvent, an acetone and dimethylsulfoxide (DMSO) solvent, a DMSO and methanol solvent, a DMSO and potassium chloride (KCl) and water solvent, a KCl and water solvent, water, a t-butanol and water solvent, an ethanol and water solvent, a methanol and water solvent, an l-propanol and water solvent, an n-propanol and water solvent, an NaCl and water solvent, a piperazine solvent, a diethylene-diamine solvent, a formamide solvent, a dimethylformamide (DMF), a DMSO solvent, a hexamethylphosphoric triamide solvent, a glycols solvent, a glycerol solvent, a dichloromethane solvent, a polar solvent, an acetone/water solvent, a dioxane solvent, an aqueous alkali solvent, a methanol/methylene chloride solvent, an N-ethylpyridinium chloride and DMF solvent, a chloroform solvent, an acetone solvent, a pyridine solvent, an ester solvent, a cyclohexanone solvent, an N-

ethylpyridinium chloride and pyridine solvent, a diluted acid solvent, or an ethylene diamine solvent.

51. The system of claim 48, wherein said solvent is configured to not dissolve said structural material.

52. The system of claim 51, wherein said solvent comprises one of an organic solvent, a hydrocarbon solvent, a chlorinated hydrocarbon solvent, a lower alcohol solvent, a tetrahydrofuran solvent, a ketone solvent, a carboxylic acid solvent, an ester solvent, salt solvent, a water solvent, a diethyl ether solvent, a methylene chloride solvent, an ethanol solvent, an aliphatic hydrocarbon solvent, a diluted aqueous alkali solvent, or an alcohol solvent.

53. The system of claim 45, wherein said jettable vehicle component further comprises one of a humectant, a surfactant, a colorant, a drier, a thinner, a wax, a lubricant, a reducing oil, a solvent, a body gum, a binding varnish, an antioxidant, an anti-skinning agent, a resin, or a binder.

54. A method for forming a slow release dosage of oral medication comprising:

disposing a first layer of polymer based structural material adjacent to an inkjet dispenser;

jetting a jettable pharmaceutical solution onto said polymer based structural material with said inkjet dispenser; and

dispensing a second layer of polymer based structural material over said jettable pharmaceutical solution.

55. The method of claim 54, further comprising varying a quantity of said first and second layer of polymer to vary a release rate of said pharmaceutical solution.

56. The method of claim 54, wherein said inkjet dispenser comprises one of a thermally actuated inkjet dispenser, a mechanically actuated inkjet dispenser, an electro-statically actuated inkjet dispenser, a magnetically actuated dispenser, a piezo-electrically actuated inkjet dispenser, or a continuous inkjet dispenser.

57. The method of claim 54, wherein said polymer based structural material comprises one of a maltotriose-based pullulan, a gelatin, a polyvinyl alcohol (PVA), a PVA-polyethylene oxide, a PVA-vinylamine, a polyvinyl pyrrolidone (PVP), a PVP-polyvinyl acetate, a cationic PVP, a crosslinked PVP, a sorbitol, a wheat gluten, a seaweed, a cellulose, a methyl cellulose, a hydroxypropyl methyl cellulose (HPMC), a poly vinyl methyl ether (PVME), a PVME- propylene glycol monomethyl ether acetate (PMA), a poly (2-ethyl 2-oxazoline), or a pectin.

58. The method of claim 54, wherein said jettable pharmaceutical solution comprises:

- an oral drug component; and
- an edible jettable vehicle component combined with said oral drug component.

59. The method of claim 58, wherein said jettable vehicle component comprises a solvent.

60. The method of claim 59, wherein said solvent is configured to dissolve said oral drug component.

61. The system of claim 60, wherein said solvent is configured to partially dissolve said structural material.

62. The system of claim 61, wherein said solvent comprises one of a water and methanol acetonitrile solvent, an acetone and dimethylsulfoxide (DMSO) solvent, a DMSO and methanol solvent, a DMSO and potassium chloride (KCl) and water solvent, a KCl and water solvent, water, a t-butanol and water solvent, an ethanol and water solvent, a methanol and water solvent, an l-propanol and water solvent, an n-propanol and water solvent, an NaCl and water solvent, a piperazine solvent, a diethylene-diamine solvent, a formamide solvent, a dimethylformamide (DMF), a DMSO solvent, a hexamethylphosphoric triamide solvent, a glycols solvent, a glycerol solvent, a dichloromethane solvent, a polar solvent, an acetone/water solvent, a dioxane solvent, an aqueous alkali solvent, a methanol/methylene chloride solvent, an N-ethylpyridinium chloride and DMF solvent, a chloroform solvent, an acetone solvent, a pyridine solvent, an ester solvent, a cyclohexanone solvent, an N-ethylpyridinium chloride and pyridine solvent, a diluted acid solvent, or an ethylene diamine solvent.

63. A system for producing an oral medication comprising:
a polymer based structural means for supporting a pharmaceutical solution; and
a jettable pharmaceutical solution jetted onto said polymer based structural means.

64. The system of claim 63, wherein said jettable pharmaceutical solution comprises:
a means for medicating; and
a means for transporting said means for medicating, said means for transporting being mixed with said means for medicating.

65. The system of claim 64, wherein said means for medicating comprises one of an ace inhibitor, an antianxiety medication, an antibiotic, a antihypertensive medication, an antiviral medication, a blood glucose regulator,

an Alzheimer-type dementia medication, an anorexiant, a central nervous system stimulant, an antidiuretic, a specific antidote, an antihistamine, an antipsychotic medication, an antimanic medication, a beta blocker, a calcium channel blocker, a contraceptive, a dermatologic, a diuretic, an estrogen, a progestin, an entrapyrimal movement disorder medication, a sedative, or a hypnotic medication.

66. The system of claim 64, wherein said means for transporting comprises a solvent.

67. The system of claim 66, wherein said solvent is configured to dissolve said means for medicating.

68. The system of claim 67, wherein said solvent is configured to partially dissolve said polymer based means for supporting.

69. The system of claim 63, further comprising:
a first means for dispensing, said first means for dispensing being configured to dispense said means for medicating; and
a second means for dispensing, said second means for dispensing being configured to dispense said polymer based means for supporting.

70. The system of claim 69, wherein said first and second means for dispensing comprise a thermally actuated inkjet dispenser, a mechanically actuated inkjet dispenser, an electro-statically actuated inkjet dispenser, a magnetically actuated dispenser, a piezo-electrically actuated inkjet dispenser, or a continuous inkjet dispenser.

71. A jettable fluid for forming a slow release oral dosage of medication between two layers of structural material comprising:
an oral drug component; and

an edible jettable vehicle component combined with said oral drug component.

72. The jettable fluid of claim 71, wherein said oral drug component comprises one of an ace inhibitor, an antianxiety medication, an antibiotic, a antihypertensive medication, an antiviral medication, a blood glucose regulator, an Alzheimer-type dementia medication, an anorexiant, a central nervous system stimulant, an antidiuretic, a specific antidote, an antihistamine, an antipsychotic medication, an antimanic medication, a beta blocker, a calcium channel blocker, a contraceptive, a dermatologic, a diuretic, an estrogen, a progestin, an entrapyramidal movement disorder medication, a sedative, or a hypnotic medication.

73. The jettable fluid of claim 71, wherein said jettable vehicle component comprises a solvent.

74. The jettable fluid of claim 73, wherein said solvent is configured to dissolve said oral drug component.

75. The jettable fluid of claim 74, wherein said solvent is configured to partially dissolve said structural material.

76. The jettable fluid of claim 74, wherein said solvent comprises one of a water and methanol acetonitrile solvent, an acetone and dimethylsulfoxide (DMSO) solvent, a DMSO and methanol solvent, a DMSO and potassium chloride (KCl) and water solvent, a KCl and water solvent, water, a t-butanol and water solvent, an ethanol and water solvent, a methanol and water solvent, an l-propanol and water solvent, an n-propanol and water solvent, an NaCl and water solvent, a piperazine solvent, a diethylene-diamine solvent, a formamide solvent, a dimethylformamide (DMF), a DMSO solvent, a hexamethylphosphoric triamide solvent, a glycols solvent, a glycerol solvent, a dichloromethane

solvent, a polar solvent, an acetone/water solvent, a dioxane solvent, an aqueous alkali solvent, a methanol/methylene chloride solvent, an N-ethylpyridinium chloride and DMF solvent, a chloroform solvent, an acetone solvent, a pyridine solvent, an ester solvent, a cyclohexanone solvent, an N-ethylpyridinium chloride and pyridine solvent, a diluted acid solvent, or an ethylene diamine solvent.

77. The jettable fluid of claim 74, wherein said solvent is configured to not dissolve said structural material.

78. The jettable fluid of claim 77, wherein said solvent comprises one of an organic solvent, a hydrocarbon solvent, a chlorinated hydrocarbon solvent, a lower alcohol solvent, a tetrahydrofuran solvent, a ketone solvent, a carboxylic acid solvent, an ester solvent, salt solvent, a water solvent, a diethyl ether solvent, a methylene chloride solvent, an ethanol solvent, an aliphatic hydrocarbon solvent, a diluted aqueous alkali solvent, or an alcohol solvent.

79. The jettable fluid of claim 74, wherein said jettable vehicle component further comprises one of a humectant, a surfactant, a colorant, a drier, a thinner, a wax, a lubricant, a reducing oil, a solvent, a body gum, a binding varnish, an antioxidant, an anti-skinning agent, a resin, or a binder.